

like form, are very rare. Some males are like the Oberthür's type, which I have handled at Vernet-les-Bains, when, last July, I paid a visit to Mr. René Oberthür; some other males have the antimarginal row of black crescents much more marked and the white pupils of the ocelli are smaller than in the type form.

I think that the female of this race of *apollo* was till now quite unknown; it is very variable, and in our series of females we have observed many individuals having some yellow spots also on the forewings; the hindwings are still more variable, because the ocelli and anal spots are often largely suffused with yellow-orange colour. On the whole the female sex is very dark.

The region of the Sierra Nevada, where Dr. Romei collected this year from May 15th to July 11th, has a very poor fauna; Dr. Romei remained there to catch because the clever Spanish botanist, Dr. Font Quer, had found there a quite peculiar flora and many botanical novelties. Not only the Rhopalocera but also the Heterocera have been scarce in that country; my son-in-law was collecting every night by lamplight, but the nocturnal captures have not been successful. At any rate we have till now neither set nor studied our Andalusian Lepidoptera, and we cannot say whether, besides the *apollo*, we have in our stock many other interesting things.

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### Miscellaneous Notes from Argentina. I.

By KENNETH J. HAYWARD, F.E.S.

The object of these notes is to record from time to time any observations that have been made bearing on the insect fauna of South America, especially that part comprising Northern Argentina to the East. The notes are as stated in the title, miscellaneous notes and nothing more. They are simply an attempt to bring together in one place, and without undue delay, notes that would otherwise be scattered, if indeed ever published.

The writer is one whose time and opportunities are limited, but whose work has again taken him into the backwoods of the world, in a place where every insect is a potential new species, and even the commonest are of interest.

Having introduced these notes one cannot now do better than introduce the locality they will cover in the main, the Argentine Chaco. Geographically this area is partly in the northern territory of the Province of Santa Fé and partly the southern portion of the Chaco proper, but to the Argentine all is "El Chaco." There is no natural division and no outstanding natural feature, other than the Rio Parana, that forms the Eastern boundary and separates these provinces from Corrientes. Civilization has scarce penetrated, and the few colonies that have grown up round the tannin factories, and in the few small tracts of agricultural land, are little else than villages. Of these four or five will figure constantly in these notes. Few maps will show them, and it may be of interest to give the reader an idea of their position. Commencing with Villa Ana—the writer's present home—located approximately 28°30' S. Lat. 59°35' West, we have to the north some 35 kilometres a larger town, Villa Guillermina, 30 kilometres to the south-east Tartagal, and about 110 kilometres further south La

Gallareta and the now abandoned Santa Felicia. The first four of these are tannin factories of the Forestal Company. This Company has also two large estancias, one just north of La Gallareta, and the other, an area approximately 430,000 acres, at La Aurora, to the north-east of Villa Guillermina. There is a small village known as Ocampo, about 25 kilometres east, and to the north of this the villages of San Antonio and Las Toscas, all centres of cultivated land. The area is served by the Ferro-Carril de Santa Fé, and there are a few small towns along its route, and one giant amongst the pygmies in Vera, a town in the neighbourhood of La Gallareta. Of the remaining places that are likely to be mentioned few will be other than temporary wood cutting stations, or loading points. The land itself is absolutely flat. There are naturally differences in levels, but they are so small and so gradual that they escape one's notice. The soil is heavy and for the most part clayey, and without one particle of stone deposit. At about 20 feet there is a substratum of sand, and one encounters back filtration from the Rio Parana. The soil I speak of here is that of the forests and I cannot say anything of the soil around the agricultural districts, as of this I have no experience. After rain, water lies on the surface for long periods and the forests are in places transformed into little better than swamps. The forest area may be roughly divided up into three types. Firstly the cañadas and esterros, low lying tracts containing lakes or river beds, dry or wet according to the time that has elapsed since the last rain, covered with coarse grass or reeds, difficult and unpleasant to traverse on foot when dry, and impossible when wet, and not of great interest entomologically, but of the greatest to any ornithologist, harbouring as they do a more wonderful collection of bird life than it has ever been my luck to previously encounter. Secondly, the forest proper. And lastly, the forest edges, in which one must include the forest glades and the rough grazing areas around the villages. This last area is for the most part covered with coarse grasses and weeds that from March till September wear a garb of brown, and awaking with the spring rains burst into flower about November, and from then till the end of February are a blaze of every colour, and swarm with insect life. The forest proper is in its virginity, dense with the undergrowth of ages; but in the nearer parts, where the quebracho tree has been cleared and carted to the factories to extract the tannin, there are numerous tracks large and small, and much of the undergrowth has been burnt or cut away. None of the trees are large as forest trees go, the forest edge reminding one strongly of the outskirts of the New Forest.

It was my intention to give a list of the forest trees, but now that I have reached the point where it is necessary to do so I realise its impossibility in such notes as these. The list that lies before me contains the local names of no less than 125 trees, and this list includes only those that are useful for their woods. There are many hundreds of smaller bushes, and it is on these that the greater number of larvae will be found to feed. Most of the trees are hardwoods, and let it suffice to mention only those that are commonest. Everywhere one sees quebracho colorado (*Schinopsis lorentzii*, Engl.), quebracho blanco (*Aspidosperma quebracho*, Schlecht), Urunday (*A. austrouium*, Esp.), Ibirapitá (*Peltophorum vogelianum*, Benth.), Algarrobo blanco (*Prosopis alba*, Gr.), Algarrobo macha (*P. prosopis*, Kunt.), Cedro (*Cedrela fesilas*, ),

Espinillo blanco (*Acacia aroma*), Espina corona (*Gleditschia amorphoides*), Guayacan negro, and blanco (*Leguminosae*), and the fruit-bearing yellow and white laurel (*L. hediundo* and *C. preta*), Nangapirú (*A. pitanga*). A few of the pink flowered Lapacho (*T. florescens*, Benth.), worth travelling far to see when in flower in late August. In the open plains the useless but shade giving Ombu (*Phytolacca dioica*, L.), and many species of *Acacia*. Most of the trees and bushes are spine-bearing, and the life of a net is short, to say nothing of the joys of chasing a coveted specimen through such undergrowth. One of the commonest bushes in the immediate neighbourhood of Villa Ana is a *Ramnacia*, Coronillo (*Scutia buxifolia*, Reiss.). A larva which I have not at the moment identified strips large quantities of the bush twice yearly. Amongst the cultivated trees are a few species of Conifers, and one or two imported English Oaks, the usual fruit trees and vines, and all the village streets are lined with Paraiso (*Melia azadirachta*, L.), a tree reminiscent of the East, whence it has been imported in large quantities. A species of Palm that I do not identify is found commonly round Tartagal and Golondrina, and locally elsewhere, and the gardens contain several species of ornamental palms. In writing this note on the trees I would add that my source of information for the generic and specific names has been limited to certain notes, for the reliability of which I cannot vouch.

Of the land and water flowers and grasses I will say nothing here. Their name is legion, and they must prove their entomological value before we can bother about them. Many are probably still unnamed, and without the possibilities of reference to works on Argentine Flora, and such books are few, I have many times to put "unknown" to the food-plant of an insect and await with patience the day I can clear up the mystery through some lucky reference to book or botanist. Another factor that should find brief reference in this introduction is weather. Spring officially commences on September 21st, Summer, December 21st, Autumn, March 21st, and Winter, June 21st. In effect one must consider Spring as commencing immediately after the September rains, when everything again takes on the green freshness that the comparative cold of winter has turned to brown.

Winter at this spot is fairly mild, with a few days of frost when the thermometer drops to possibly one or two degrees below freezing-point on the ground, and when the wind blows cold and biting from the south. In summer the temperature may rise to 110°F., but rarely goes above 104°F. There is a fairly distinct cyclic movement about the summer temperature. It rises gradually from day to day till it reaches a comparatively high level, and remains about this point for a day or two till a thunderstorm, more usually than not of terrific proportions, breaks, and with it the heat, which, falling probably to about the 80° mark again commences to climb till another storm comes to relieve us. I have recently started keeping certain meteorological records, whereby it will later be possible to say something about the average monthly temperature, rainfall, etc., figures that at the moment are pure guesswork. As for rain, in the time I have been in this spot very little has fallen, but October till January, or later, appear to be months of potential rainfall, whilst practically none falls in the winter months. Since the country is so flat the winds are often of great strength, with prevailing northerly or southerly direction. Winds

from the east or west seem, in my experience, to be uncommon. The relative humidity per cent. of the air varies very greatly and very rapidly, and I have readings from 20% to 90%, though readings below 30% are rare and appear only to occur in the dry winter season.

It should be added that all the insects mentioned in the following notes are forwarded to the British Natural History Museum at South Kensington, and there absorbed in the National Collection.

In concluding this introductory note I would like to place on record my sincere thanks to the Staff of the Entomological Section of the Natural History Museum for their unfailing and very real assistance in identifying the insects sent them, and for advice freely given. Only those cut off from all sources of reference to libraries or collections can realise how valuable this assistance proves, and when one knows, as the writer does, how busy these gentlemen are, the fact that they find time to do all this, gives one the greatest encouragement.

(To be continued.)

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### Remarks on the evolution of the *Zygaenae* and an attempt to analyse and classify the variations of *Z. lonicerae*, Scheven, and of *Z. trifolii*, Esp., and other subspecies. (With Plate VIII.)

By ROGER VERITY, M.D.

(Continued from p. 138.)

*Z. transalpina* and *Z. ephialtes*, with the oriental *doryenii*, seem to constitute another little group, which has developed from a common ancestor more recently than the preceding ones, so that its species have not undergone the same amount of cold. The Alpine race of *transalpina* is probably the oldest, which separated from *doryenii* as a catabolic offshoot; it spread westward all over the south of Europe, but its power of adaptation was limited, as in the case of the other less ancient species, so that increasing heat restricted it in Spain, to a few high mountains, whilst northward it attempted to spread, but it degenerated into weakly anabolic *astragali* and *occidentalis*; on the contrary in the warm coast climate of S. France and Italy it settled down into *maritima*, and other races, certainly anabolic, because they are very variable and sensitive to surroundings and bulky in structure, and localised to the particular spots that suit them; in the drier surroundings of mountains and of the hinterland the slimmer and less variable *intermedia* holds its ground by being more catabolic, and at high altitudes it degenerates into the dwarf *altitudinaria*. At the extreme southern limit of the species (S. Italy) overstimulation produces such an increase of the dark primary pattern that even the hindwing is often entirely darkened over, whilst in some localities the red secondary pattern is in many individuals so retarded that it only reaches the yellow degree of oxydation, a phenomenon not observed racially in any other *Zygaena*, except *ephiates*. On the contrary at the extreme northern limits of the species (N. France) the primary pattern is often very reduced by the depressing effect of cold, and the red spots spread into large patches. As to *ephiates* it stands apart from the rest of the genus by the nearly total obliteration of the secondary pattern in the large majority of its races; it resembles *lavandulae* by the specific entire blackening of the hindwing and its